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### (54) SOIL FOUNDATION BED MATERIAL

#### (57)Abstract:

PROBLEM TO BE SOLVED: To obtain an excellent plant growth effect and to inexpensively and effectively utilize wastes by adding microorganisms to a raw material mixture composed of bark compost, sludge, black soil, livestock night soil and shell incineration ash as essential components and subjecting the mixture to fermentation and maturation.

SOLUTION: This soil foundation bed material is obtained by adding the microorganism to the raw material mixture and subjecting the mixture to the fermentation and maturation. The raw material mixture contains the bark compost, sludge, black soil, livestock night soil and shell incineration ash as the essential components. The content ratios of the essential components are preferably 15 to 25 pts.wt. bark compost, 15 to 25 pts.wt. sludge, 20 to 25 pts.wt. black soil, 15 to 40 pts.wt. livestock night soil and 0.7 to 1.5 pts.wt. shell incineration ash when the total is defined as 100 pts.wt. The

microorganisms to be added to the raw material mixture are preferably the effective microorganism groups which are preferably antioxidative, produce lactic acid, do not produce butyric acid, do not have virulence and have an antagonistic value of  $\geq 50$  and include, for example, actinomycetes, photosynthesis bacteria, filamentous fungi, yeast, and the like.

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## DETAILED DESCRIPTION

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### [Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to soil base material. In the broad application which used effectively in more detail the trash which used woody trash effectively, such as bark compost and sludge, it is related with useful soil base material.

[0002]

[Description of the Prior Art] Inherent powers' declining by use of agricultural chemicals, such as a herbicide and a germicide, and continuous use of chemical fertilizer is known well. The key factor of such a fall of inherent powers is based on reduction of a soil organic matter and a soil effective microorganism, and use of manure, such as a compost, use of an effective microorganism activator, etc. are performed as the cure. However, the vegetable training effectiveness of the manure by which the conventional proposal is made etc. cannot be enough, or its cost performance is not enough, and it cannot be satisfied enough yet.

[0003] on the other hand, the amount and a class carry out measure measure increase, and domestic wastes or industrial waste poses a problem with the serious processing in recent years. The wood cut down as part [ this trash ] of a deployment for land development, Chip processing of the woody trash, such as dismantling wood, such as thinning wood thinned out for the root and forest training which carried out stump pulling, a pruning branch, or a wooden building, is carried out. Using a microorganism, fermenting, ripening it, fermenting, ripening [ use a microorganism, ] bark compost, nothing, or the so-called kitchen garbage, and using a compost, nothing, and them effectively as manure etc. is known well. However, many of trash gets used just to the cause of environmental pollution, and the present condition is that the still sufficient deployment approach is not found out.

[0004]

[Problem(s) to be Solved by the Invention] This invention is to offer the soil base material which can serve as manure which has the vegetable training effectiveness of having excelled further in view of the above-mentioned conventional situation, and utilizes trash much more effectively, and can be manufactured cheaply. By this invention, the great portion of trash can be used effectively as a resource.

[0005]

[Means for Solving the Problem] As a result of inquiring wholeheartedly that the purpose of above-mentioned this invention should be attained, by choosing and combining a specific thing as a raw material, this invention person found out that the purpose of

above-mentioned this invention could be attained, and completed this invention.

[0006] That is, this invention offers the soil base material characterized by having used bark compost, sludge, black soil, zootechnics manure, and shell incinerated ash as the indispensable component, having added the microorganism to the raw material mixture which comes to mix soil conditioners, such as an organic object of putrescibility and/or a vermiculite, coconut husks, and charcoal, if needed, having fermented, having ripened this raw material mixture, and be obtained, in order to attain the purpose of above-mentioned this invention.

[0007]

[Embodiment of the Invention] By this invention, as bark compost used as a raw material, the bark compost known from the former can be chosen suitably, and can be used. Chip processing of the woody trash, such as dismantling wood, such as thinning wood generally thinned out for the wood cut down for land development, the root, and forest training which carried out stump pulling, a pruning branch, or a wooden building, is carried out, and it ferments, ripens [ bark compost uses a microorganism, ] a part of it, and is manufactured. It means that using bark compost had used woody trash effectively. As for this bark compost, it is undoubted that a commercial item may be chosen suitably, and may be used and you may manufacture from woody trash with a conventional method to the raw materials of this invention. Moreover, what processed the chip-sized part into charcoal and fine coal can be mixed and used for the soil base material of this invention as the below-mentioned soil conditioner.

[0008] on the occasion of manufacture of the above-mentioned bark compost, the microorganism by which use in the field concerned was known from the former could be chosen suitably, and could be used as a microorganism, and, generally it was chosen out of an Actinomyces, a photosynthetic bacterium, lactic acid bacteria, mold, yeast, etc., although a kind is used at least Especially, a lactic acid is produced by acid-fast, butanoic acid is not produced, and it does not have virulence, and the effective microbial population (it is called "EM bacillus" for short below Effective Micro-organisms:) which is 50 or more antagonism values can be used preferably. This EM bacillus contains a microorganism anaerobic [ of 80 or so department of five 10 group kinds, such as a useful Actinomyces, a photosynthetic bacterium, lactic acid bacteria, mold, and yeast, ], and aerobic in the agricultural production of the microorganisms which exist in a nature etc. As an example of the Actinomyces in this EM bacillus, it is Strepto-myces. sp. (ATCC 3004), Streptoverticillium sp. (ATCC 23654), Nocardia sp. (ATCC 19247), Micromonospora sp. (ATCC 12452), Rhodococcus sp., etc. are mentioned. As an example of; photosynthetic bacterium Rhodopseudomonas sp. (R. sphaeroides), Rhodospirillum sp. (R. fulum), Chromatium sp. (C. okenii), Chlorobium sp. (C. limicola) etc. is mentioned. As an example of; lactic acid bacteria (lactic-acid generation bacillus) Lactobacillus sp. (IFO 3070) Propionibacterium sp. (P. freudenreichii), Pediococcus sp. (P. halophilus), Streptococcus sp. (S. lactis, S. faecalis) etc. is mentioned. As an example of; mold Aspergillus sp. (RIFY 5770, RIFY 5024), Mucor sp. (IFO 8567), etc. are mentioned. As an example of; yeast Saccharomyces sp. (NRRL 1346, Y977), Candida sp. (C. utilis) etc. is mentioned. Moreover, there are various commercial items, and various commercial items can be suitably chosen as this EM bacillus, and can be used for it.

[0009] The various sludge discharged as sludge used as a raw material by this invention, for example from many facilities, such as a water purification treatment facility in

connection with water and sewage, a sewage treatment equipment, or a waste-water-treatment facility in connection with wastewater of works and others, can be used suitably. Generally, there is much moisture, sludge is decomposed, emits a nasty smell, and although the deployment is very much difficult trash, according to this invention, it can use this sludge effectively suitably as useful soil base material in the application of not only the application as manure but many. In using as a raw material of this invention, it is not necessary to restrict especially the moisture content of sludge, it can be set up suitably, and it can dehydrate thru/or dry if needed, and can adjust suitably, but generally 75 - 90 % of the weight is suitable.

[0010] As black soil used as a raw material by this invention, what is generally called black soil can be used suitably. As this black soil, if the black soil of a construction surplus soil is used, that deployment will be made. This black soil can make that amount used able to fluctuate with the above-mentioned bark compost according to the moisture content of the above-mentioned sludge, and can be operated as moisture content accommodation material for making into a predetermined moisture content raw-material mixture given to fermentation and aging processing. In this invention, although the moisture content of the raw-material mixture given to fermentation and aging processing can be set up suitably if needed, generally 10 - 40 % of the weight is suitable for it.

[0011] By this invention, zootechnics manure, such as cow manure known from the former, \*\*\*\*\*, and chicken droppings, can be chosen suitably, and can be used as zootechnics manure used as a raw material, and two or more sorts of zootechnics manure can also be used together if needed. As for these zootechnics manure, it is undoubted that a commercial item may be chosen suitably, and may be used and you may manufacture from the excrement of a zootechnics animal with a conventional method to the raw materials of this invention. Moreover, generally, these zootechnics manure can make the amount used able to fluctuate, and can be operated as organic component accommodation material for making the soil base material of this invention into an organic predetermined quantitative formula. Moreover, the amount used can be made to be able to fluctuate and the raw-material mixture given to fermentation and aging processing can also be operated as moisture content accommodation material for considering as a predetermined moisture content.

[0012] The shell incinerated ash which incinerated and ground the shell by this invention as shell incinerated ash used as a raw material, or ground, destroyed by fire, and was obtained is used. Although the raw material shell of that origin is arbitrary, without asking, it will be a shellfish adhering to piping of many facilities which contact the seawater in an electric power plant, works, etc. as this raw material shell, for example, the seawater for cooling, etc., and if the shellfish taken out as trash in the functional maintenance maintenance of these the facilities of many is used, use of this shell incinerated ash will also exactly be a deployment of trash. This shell incinerated ash has fermentation and the function to adjust the acidity of the raw-material mixture given to aging processing. That is, generally, the above-mentioned sludge has strong acidity, and in order to use as a raw material of this invention, it needs to neutralize that acidity, and it functions as this neutralizer. Generally in this invention, 6.5-7.3 are suitable for pH of the raw-material mixture given to fermentation and aging processing. Moreover, it cannot be overemphasized that this shell incinerated ash serves as a source of calcium at the time of using the soil base material of this invention as manure.

[0013] The soil base material of this invention adds a microorganism to the raw-material mixture which mixed each [ these ] raw material, using the above bark compost, sludge, black soil, zootechnics manure, and shell incinerated ash as an indispensable component, and is manufactured by fermenting and ripening it. Although it cannot generally crawl on the blending ratio of coal of each raw material with the description of each raw material, a property, etc. in that case, when the sum total of raw-material mixture, i.e., the above-mentioned indispensable component, is made into the 100 weight sections, generally, black soil is 20 - 25 weight section, zootechnics manure is 15 - 40 weight section, and it is sludge is 15 - 25 weight section, and suitable [ bark compost is 15 - 25 weight section, and ] that shell incinerated ash is the 0.7 - 1.5 weight section.

[0014] In addition to each raw material of the above-mentioned indispensable component, the organic object of putrescibility other than these indispensable components can be blended with raw-material mixture in manufacture of the soil base material of this invention if needed. As an example of this putrescibility organic object, rice bran, an oil cake, a fish meal, a kitchen garbage, etc. are mentioned. Moreover, soil conditioners, such as coconut husks, peat-moss, a vermiculite, charcoal, and fine coal, can also be blended. Kind combination of this putrescibility organic object or soil conditioner can also be carried out, and it can also be blended two or more sorts. Moreover, generally, although it cannot generally crawl on them according to those classes, description, etc., when the sum total of each raw material of an indispensable component is made into the 100 weight sections, 1 - 13 weight section is suitable for the loadings of this putrescibility organic object or a soil conditioner. It is desirable for coconut husks or a vermiculite to make it as 4 - 8 weight section, and to make especially charcoal into 4 - 5 weight section also in it.

[0015] Moreover, the microorganism same as a microorganism added to raw-material mixture as the time of manufacture of the bark compost from the above-mentioned woody trash can be used. that is, the microorganism known from the former could be chosen suitably, and could be used, and, generally it was chosen out of an Actinomyces, a photosynthetic bacterium, lactic acid bacteria, mold, yeast, etc. -- a kind is used at least and EM bacillus is used preferably especially. Although the addition of a microorganism can be set up suitably if needed [, such as a presentation of the gestalt of the microorganism added, and raw-material mixture, ], if the microorganism was the so-called gestalt of BOKASHI (what fermented the organic object with EM bacillus), when it generally makes raw-material mixture the 100 weight sections, the 1.0 - 2.0 weight section is suitable for it.

[0016] Moreover, in order to ferment and to add and ripen a microorganism into raw-material mixture, the approach at the time of manufacturing manure, such as a compost known from the former, can be adopted suitably, and can be performed. For example, it can carry [ put / addition mixing of the solid culture object of a microorganism is carried out at raw-material mixture, and / into a hermetic container / it ] out to predetermined temperature by the ability carrying out predetermined time maintenance, and it can replace with the solid culture object of a microorganism, and the culture medium of a microorganism can also be used. 6.5-7.3 have respectively 15-60 degrees C suitable [ moreover, / the moisture content of raw-material mixture ] for processing temperature generally although fermentation and the processing conditions of aging can be set up suitably if needed [, such as a presentation of raw-material mixture, and a class of used

microorganism ] as the above [ 10 - 40 % of the weight / the pH ] as above-mentioned. Although fermentation and an aging period are based also on processing temperature, generally it attains full maturity in three - eight months, and the soil base material of this invention is obtained.

[0017] The soil base material of this invention has the outstanding vegetable training effectiveness, and has the property which was [ manufacture / it / cheaply ] excellent, and can use it for various applications broadly, and the manure of the revegetation farmland of a tree thru/or its manure, home gardening farmland or its manure, potted plant farmland, a rice crop, or arviculture, the spraying base material for slope vegetation, the various materials for earth brought from another place and mixed in the soil, etc. are mentioned as the example.

[0018]

[Example] Hereafter, although an example and the example of a comparison explain this invention still more concretely, this invention is not limited to the following examples.

[0019] The bark compost (what was manufactured using commercial EM bacillus as microorganism from thinning lumber) 24 weight section of example 1 marketing, The sludge 19.8 weight section of 84 % of the weight of moisture contents discharged from the sewage treatment equipment, The shellfish which was removed from piping of 25 weight sections, the commercial cow manure 19.8 weight section, and the seawater for cooling of an electric power plant, and was discharged as trash is incinerated at 800 degrees C for 120 minutes. the black soil of a construction surplus soil -- Raw-material mixture consisted of the obtained shell incinerated ash 0.9 weight section, the coconut husks 7 weight section, and the fine coal 2.2 weight section by grinding. The moisture content of raw-material mixture was 39.7 % of the weight, and pH was 7.3. Stirring mixing of the so-called BOKASHI (what fermented organic object with EM bacillus) 1.3 weight section was carried out, and it filled up and sealed to the plastic bag at this, it riped by having held for five months and having fermented at 18 degrees C, and the target soil base material was obtained.

[0020] It put into the planter by having made into farmland the soil base material obtained the account of a top, and the vegetable seeding trial was performed. That is, the used planter was a planter with die length of 60cm, a width of face [ of 16cm ], and a height of 17cm, it bisected the longitudinal direction, inserted the dashboard in the boundary, and prepared two partitions with a die length of 30cm divided with the dashboard. And a Japanese radish and shantung Chinese cabbage were opened in one partition, and spacing was opened in the longitudinal direction, respectively, and one articles were planted (planting a total of two articles), and it carried out. Moreover, creeping red FESUKU, toll FESUKU, and a white crowbar were opened in the partition of another side, and spacing was opened in the longitudinal direction, respectively, and one articles were planted (planting a total of three articles), and it carried out. The one more same planter for a seeding trial as the above was prepared. This seeding trial performed seeding of each above-mentioned vegetation early in April, managed water spray etc. suitably, measured the die length of the leaf each vegetation of the two above-mentioned planters grew up to be after progress from seeding on the 54th, respectively, and computed those averages. The average of the die length of this leaf was shown in Table 1.

[0021] The commercial bark compost used as one of the raw materials in the example 1

as one to example of comparison 3 farmland (example 1 of a comparison), Except having used one commercial artificial soil base material (example 2 of a comparison), or other one commercial artificial soil base material (example 3 of a comparison), two planters for a seeding trial which carried out seeding were prepared like the example 1, the seeding trial was performed, the die length of the grown-up leaf was measured, and the average was computed. The average of the die length of this leaf was shown in Table 1.

[0022]

[Table 1]

[0023] Any vegetation has growth of a leaf quicker than which [ of the examples 1-3 of a comparison which used commercial bark compost or various commercial artificial soil base materials in the example 1 using the soil base material of this invention ] case, and it is clear from Table 1 to have the vegetable training effectiveness that the soil base material of this invention was excellent.

[0024]

[Effect of the Invention] According to this invention, the soil base material which can serve as manure which has the vegetable training effectiveness of having excelled further, and utilizes trash much more effectively, and can be manufactured cheaply is offered. The soil base material of this invention is useful in broad various applications from the outstanding property that it can manufacture cheaply [ have the outstanding vegetable training effectiveness and ].

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## CLAIMS

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[Claim 1] Soil base material characterized by having added the microorganism to the raw-material mixture which uses bark compost, sludge, black soil, zootechnics manure, and shell incinerated ash as an indispensable component, having fermented, having ripened this raw-material mixture, and being obtained.

[Claim 2] Soil base material according to claim 1 15 - 40 weight section and whose shell incinerated ash 20 - 25 weight section and zootechnics manure are [ bark compost / 15 - 25 weight section and sludge ] the 0.7 - 1.5 weight sections for 15 - 25 weight section and black soil when the indispensable component sum total of raw-material mixture is made into the 100 weight sections.

[Claim 3] Soil base material according to claim 1 or 2 with which the organic objects and/or soil conditioners of putrescibility other than an indispensable component are mixed by raw-material mixture in addition to the indispensable component.

[Claim 4] the organic object of putrescibility other than an indispensable component was chosen from rice bran, the oil cake, the fish meal, and the kitchen garbage -- the soil base material according to claim 3 as which it is a kind at least and the soil conditioner was chosen from coconut husks, peat-moss, a vermiculite, charcoal, and fine coal and which is a kind at least.

[Claim 5] Soil base material according to claim 3 or 4 by which 1-13 weight section mixing of the soil conditioner is carried out to the indispensable component 100 weight

section of raw-material mixture.

[Claim 6] Soil base material according to claim 1 to 5 which is the effective microbial population a microorganism produces a lactic acid by acid-fast, does not produce butanoic acid, and does not have virulence, and are [ microbial population ] 50 or more antagonism values.

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(54)【発明の名称】 土壌基盤材

## (57)【要約】

【課題】 優れた植物育成功果を有する有機質肥料等となり得て、かつ廃棄物を有效地に活用して安価に製造できる土壌基盤材を提供すること。

【解決手段】 土壌基盤材を、パーク堆肥、汚泥、黒土、高麗下肥、木炭、および貝殻焼却灰を必須成分とする原材料混合物に微生物を加え、該原材料混合物を発酵、熱成させて製造する。

(2)

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## 【特許請求の範囲】

【請求項1】 パーク堆肥、汚泥、黒土、音産下肥および貝殻焼却灰を必須成分とする原材料混合物に微生物を加え、該原材料混合物を発酵、熟成させて得られたことを特徴とする土壤基盤材。

【請求項2】 原材料混合物の必須成分合計を100重量部としたとき、パーク堆肥が15～25重量部、汚泥が15～25重量部、黒土が20～25重量部、音産下肥が15～40重量部、貝殻焼却灰が0.7～1.5重量部である請求項1に記載の土壤基盤材。

【請求項3】 原材料混合物に、必須成分に加えて、必須成分以外の腐敗性の有機質物および／または土壤改良剤が混合されている請求項1又は2に記載の土壤基盤材。

【請求項4】 必須成分以外の腐敗性の有機質物が米穀、油粕、魚粉および生ゴミから選ばれた少なくとも一種であり、土壤改良剤がヤシ殻、ピートモス、バーミキュライト、木炭および粉炭から選ばれた少なくとも一種である請求項3に記載の土壤基盤材。

【請求項5】 原材料混合物の必須成分100重量部に對して、土壤改良剤が1～13重量部混合されている請求項3又は4に記載の土壤基盤材。

【請求項6】 微生物が、抗酸性で乳酸を生産し酪酸を生産せず病原性を有さずかつ拮抗価50以上である有効微生物群である請求項1乃至5に記載の土壤基盤材。

## 【発明の詳細な説明】

## 【0001】

【産業上の利用分野】 本発明は、土壤基盤材に関する。さらに詳しくは、木質廃棄物を有効利用したパーク堆肥、汚泥などの廃棄物等を有効利用した、幅広い用途において有用な土壤基盤材に関する。

## 【0002】

【従来の技術】 除草剤、殺菌剤等の農薬の使用や、化学肥料の連用によって地力が低下することは良く知られたことである。このような地力の低下の主要因は、土壤有機物および土壤有効微生物の減少によるものであり、その対策として、堆肥等の有機質肥料の施用、有効微生物活性剤の施用などが行われている。しかし、従来提案されている有機質肥料等は、その植物育成効果が十分でなかったり、コスト・パフォーマンスが十分でなかったりして、まだ十分満足できるものではない。

【0003】 一方、近年、一般廃棄物あるいは産業廃棄物は、その量、種類ともにますます増大し、その処理が大きな問題となっている。かかる廃棄物の有効利用の一環として、土地開発のため伐採した木村、抜根した根、森林育成のため間伐した間伐木材、剪定枝、あるいは木造家屋等の解体木材等の木質廃棄物をチップ加工し、それを微生物を利用して発酵、熟成させてパーク堆肥とな

て有効利用することは良く知られている。しかし、廃棄物の多くは、環境汚染の原因にこそなれ、未だ十分な有効利用方法は見出されてないのが現状である。

## 【0004】

【発明が解決しようとする課題】 本発明は、上記従来の状況に鑑み、一層優れた植物育成効果を有する有機質肥料等となり得て、かつ廃棄物を一層有効に活用して安価に製造できる土壤基盤材を提供することにある。本発明により、廃棄物の大部分を資源として有効利用することができる。

## 【0005】

【課題を解決するための手段】 本発明者は、上記本発明の目的を達成すべく鋭意研究した結果、原材料として特定のものを選択し、組み合わせることによって、上記本発明の目的を達成できることを見出して本発明を完成した。

【0006】 すなわち、本発明は、上記本発明の目的を達成するために、パーク堆肥、汚泥、黒土、音産下肥および貝殻焼却灰を必須成分とし、必要に応じて腐敗性の有機質物、及び／又はバーミキュライト、ヤシ殻、木炭等の土壤改良剤を混合してなる原材料混合物に微生物を加え、該原材料混合物を発酵、熟成させて得られたことを特徴とする土壤基盤材を提供する。

## 【0007】

【発明の実施の形態】 本発明で原材料として用いるパーク堆肥としては、従来から知られたパーク堆肥を適宜選択して用いることができる。パーク堆肥は、一般に、土地開発のため伐採した木村、抜根した根、森林育成のため間伐した間伐木材、剪定枝、あるいは木造家屋等の解体木材等の木質廃棄物をチップ加工し、それを一部微生物を利用して発酵、熟成させて製造される。パーク堆肥を用いることは、木質廃棄物の有効利用をなしたこととなる。このパーク堆肥は、市販品を適宜選択して用いても良いし、本発明の原材料用に木質廃棄物から常圧により製造しても良いことは無論である。又、チップ化した一部を木炭、粉炭に加工したものは、後述の土壤改良剤として本発明の土壤基盤材に混合し利用することができる。

【0008】 上記パーク堆肥の製造に際しては、微生物として、従来から当該分野での使用が知られた微生物を適宜選択して用いることができ、一般に、放線菌、光合成菌、乳酸菌、糸状菌、酵母等から選ばれた少なくとも一種が用いられるが、中でも、抗酸性で乳酸を生産し酪酸を生産せず病原性を有さずかつ拮抗価50以上である有効微生物群（Effective Micro-organisms：以下「EM菌」と略称する）を好ましく用いることができる。このEM菌は、自然界に存在する微生物の内の農業生産などに有用な放線菌、光合成

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中の放線菌の例として、*Strepto-myces* sp. (ATCC 3004)、*Streptoverticillium* sp. (ATCC 2365-4)、*Nocardia* sp. (ATCC 1924-7)、*Micromonospora* sp. (ATCC 12452)、*Rhodococcus* sp. 等が挙げられ；光合成菌の例として、*Rhodopseudomonas* sp. (*R. sphaeroides*)、*Rhodospirillum* sp. (*R. fulum*)、*Chromatium* sp. (*C. okenii*)、*Chlorobium* sp. (*C. limicola*) 等が挙げられ；乳酸菌（乳酸生成菌）の例として、*Lactobacillus* sp. (IFO 3070)、*Propionibacterium* sp. (*P. freudenreichii*)、*Pediococcus* sp. (*P. halophilus*)、*Streptococcus* sp. (*S. faecalis*、*S. faecaliis*) 等が挙げられ；糸状菌の例として、*Aspergillus* sp. (RIFY 5770、RIFY 5024)、*Mucor* sp. (IFO 8567) 等が挙げられ；酵母の例として、*Saccharomyces* sp. (NRRL 1346、Y977)、*Candida* sp. (*C. utilis*) 等が挙げられる。また、このEM菌には、各種市販品があり、各種市販品を適宜選択して用いることができる。

【0009】本発明で原材料として用いる汚泥としては、例えば上下水道に關わる浄水処理施設、下水処理施設、あるいは工場その他の排水に關わる排水処理施設等の諸施設から排出される各種汚泥を適宜用いることができる。一般に、汚泥は、水分が多く、腐敗して異臭を発散し、その有効利用がなかなか難しい廃棄物であるが、本発明によれば、かかる汚泥を、有機質肥料としての用途のみならず多くの用途において有用である土壤基盤材として好適に有効利用することができる。本発明の原材料として用いるに当たり、汚泥の水分含有量は、特に制限する必要なく適宜設定することができ、必要に応じて脱水ないし乾燥して適宜調整することができるが、一般に、75～90重量%が適当である。

【0010】本発明で原材料として用いる黒土としては、一般に黒土と呼ばれているものを適宜用いることができる。この黒土として、建設残土の黒土を用いれば、その有効利用をなすこととなる。この黒土は、上記パーク堆肥と共に、上記汚泥の水分含有量に応じてその使用量を増減させて、発酵、熱成処理に付す原材料混合物を所定の水分含有量とするための水分含有量調節材として機能させることができる。本発明において、発酵、熱成処理に付す原材料混合物の水分含有量は、必要に応じて

【0011】本発明で原材料として用いる畜産下肥としては、従来から知られた牛肥、豚肥、鶏糞等の畜産下肥を適宜選択して用いることができ、必要に応じて複数種の畜産下肥を併用することもできる。これら畜産下肥は、市販品を適宜選択して用いても良いし、本発明の原材料用に畜産動物の排泄物から常法により製造しても良いことは無論である。また、これら畜産下肥は、一般に、その使用量を増減させて、本発明の土壤基盤材を所定の有機成分含有量とするための有機成分調節材として機能させることができる。また、その使用量を増減させて、発酵、熱成処理に付す原材料混合物を所定の水分含有量とするための水分含有量調節材として機能させることもできる。

【0012】本発明で原材料として用いる貝殻焼却灰としては、貝殻を焼却し粉碎してあるいは粉碎し焼却して得られた貝殻焼却灰が用いられる。原料貝殻はその由来は問うことなく任意であるが、この原料貝殻として、例えば発電所、工場等における廃水と接触する諸設備、例えば冷却用海水の配管等に付着していた貝であって、該諸設備の機能保全メンテナンスにおいて廃棄物として取り出された貝を用いれば、この貝殻焼却灰の使用も廃棄物の有効利用に佔ならない。この貝殻焼却灰は、発酵、熱成処理に付す原材料混合物の酸性度を調整する機能を有する。すなわち、上記汚泥は、一般に、酸性が強く、本発明の原材料として用いるためにはその酸性を中和する必要があり、この中和剤として機能する。本発明において、発酵、熱成処理に付す原材料混合物のpHは、一般に、6.5～7.3が適当である。また、この貝殻焼却灰は、本発明の土壤基盤材を有機質肥料として用いた場合のカルシウム源となることはいうまでもない。

【0013】本発明の土壤基盤材は、上記のようなパーク堆肥、汚泥、黒土、畜産下肥および貝殻焼却灰を必須成分として用い、これら各原材料を混和した原材料混合物に微生物を加え、それを発酵、熟成させることにより製造される。その際、各原材料の配合割合は、各原材料の性状、特性等によって一概にはいえないが、一般に、原材料混合物、すなわち上記必須成分の合計を100重量部としたとき、パーク堆肥が15～25重量部で、汚泥が15～25重量部で、黒土が20～25重量部で、畜産下肥が15～40重量部で、貝殻焼却灰が0.7～1.5重量部であることが適当である。

【0014】本発明の土壤基盤材の製造に当たり、原材料混合物には、必要に応じて、上記必須成分の各原材料に加えて、これら必須成分以外の腐敗性の有機質物を配合することができる。この腐敗性有機質物の例として、米糠、油粕、魚粉、生ゴミ等が挙げられる。また、ヤシ殻、ビートモス、バーミキュライト、木炭、粉炭等の土壤改良剤を配合することもできる。この腐敗性有機質物

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物あるいは土壤改良剤の配合量は、それらの種類、性状等によって一概にはいえないが、一般に、必須成分の各原材料の合計を100重量部としたとき、1~13重量部が適当である。その中でも特に、ヤシ殻、又はバーミキュライトは4~8重量部、木炭は4~5重量部とすることが好ましい。

【0015】また、原材料混合物に加える微生物としては、上記の木質発酵物からのパーク堆肥の製造の際と同様の微生物を用いることができる。すなわち、従来から知られた微生物を適宜選択して用いることができ、一般に、放線菌、光合成菌、乳酸菌、糸状菌、酵母等から選ばれた少なくとも一種が用いられ、中でも、EM菌が好ましく用いられる。微生物の添加量は、添加される微生物の形態、原材料混合物の組成等必要に応じて適宜設定することができるが、微生物が、いわゆるポカシ（有機質物をEM菌で発酵させたもの）の形態であるとすれば、一般に、原材料混合物を100重量部としたとき、1.0~2.0重量部が適当である。

【0016】また、原材料混合物に微生物を加えて発酵、熟成させるには、従来から知られた堆肥等の有機質肥料を製造する際の方法を適宜採用して行うことができる。例えば、原材料混合物に微生物の固形培養物を添加混和し、それを密封容器に入れて所定温度に、所定時間保持して行うことができ、また微生物の固形培養物に代えて微生物の培養液を用いることもできる。また、発酵、熟成の処理条件は、原材料混合物の組成、用いた微生物の種類等必要に応じて適宜設定することができるが、一般に、原材料混合物の水分含有量は上記のとおり10~40重量%が、そのpHは上記のとおり6.5~7.3が、処理温度は15~60°Cがそれぞれ適当である。発酵、熟成期間は、処理温度によるが、一般に3~8ヶ月で完熟して、本発明の土壤基盤材が得られる。

【0017】本発明の土壤基盤材は、優れた植物育成効果を有し、かつ安価に製造できる等の優れた特性を有していて、種々の用途に幅広く用いることができ、その例として、樹木の植栽用土ないしその有機質肥料、家庭園芸用土ないしその有機質肥料、鉢植用土、稻作あるいは畑作の有機質肥料、法面緑化用吹付基盤材、各種客土用資材等が挙げられる。

【0018】

【実施例】以下、実施例および比較例により本発明をさらに具体的に説明するが、本発明は以下の実施例に限定されるものではない。

\* 【0019】実施例1

市販のパーク堆肥（間伐材木から微生物として市販のEM菌を用いて製造されたもの）24重量部、下水処理施設から排出された水分含有量84重量%の汚泥19.8重量部、建設残土の黒土25重量部、市販の牛糞19.8重量部、発電所の冷却用海水の配管から除去されて廃棄物として排出された貝を800°Cで120分焼却し、粉碎することによって得られた貝殻焼却灰0.9重量部、ヤシ殻7重量部、及び粉炭2.2重量部から原材料混合物を構成した。原材料混合物は、水分含有量が39.7重量%で、pHは7.3であった。これに、いわゆるボカシ（有機質物をEM菌で発酵させたもの）1.3重量部を搅拌混和してピニール袋に充填して密閉し、18°Cにて5ヶ月間保持して発酵、熟成を行って目的の土壤基盤材を得た。

【0020】上記得られた土壤基盤材を用土としてプランターに入れて植物の播種試験を行った。すなわち、用いたプランターは、長さ60cm、幅16cm、高さ17cmのプランターであり、その長手方向を二等分してその境界に仕切板を挿入し、仕切板で仕切られた長さ30cmの2区画を調製した。そして、一方の区画に、大根および山東白菜をそれぞれ、長手方向にそれぞれ間隔をあけて一条蒔き（台計二条蒔き）した。また、他方の区画に、クリーピングレッドフェスク、トールフェスクおよび白クローバーをそれぞれ、長手方向にそれぞれ間隔をあけて一条蒔き（台計三条蒔き）した。上記と同様の播種試験用プランターをもう一つ準備した。この播種試験は、4月初旬に上記各植物の播種を行い、散水等の管理を適宜行い、播種から5~4日経過後に、上記二つのプランターの各植物の成長した葉の長さをそれぞれ測定し、それらの平均値を算出した。この葉の長さの平均値を表1に示した。

【0021】比較例1~3

用土として、実施例1で原材料の一つとして用いた市販のパーク堆肥（比較例1）、市販の一つの人工土壤基材（比較例2）または市販の他の一つの人工土壤基材（比較例3）を用いたこと以外は、実施例1と同様に、播種した播種試験用プランターを二つ準備し、播種試験を行ない、成長した葉の長さを測定し、その平均値を算出した。この葉の長さの平均値を表1に示した。

【0022】

【表1】

\*

	実施例1 (cm)	比較例1 (cm)	比較例2 (cm)	比較例3 (cm)
大根	21.35	15.55	15.60	15.80
山東白菜	23.70	15.35	14.90	14.05
クリーピングレッドフェスク	18.10	8.35	9.30	10.55
トールフェスク	15.35	8.45	9.25	11.20

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土壤基材を用いた比較例1～3のいずれの場合よりも、  
いずれの植物も葉の成長が遅く、本発明の土壤基盤材が  
優れた植物育成効果を有することは明らかである。

【0024】

【発明の効果】本発明によれば、一層優れた植物育成効果\*

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\* 崇を有する有機質肥料等となり得て、かつ廃棄物を一層  
有効に活用して安価に製造できる土壤基盤材が提供され  
る。本発明の土壤基盤材は、優れた植物育成効果を有  
し、かつ安価に製造できるという優れた特性から、幅広  
い種々の用途において有用である。

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